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EDITORIAL NOTES

APRÈS LA GUERRE

WE have been reading an article in the current issue of the *Co-partnership Journal* of the South Metropolitan Gas Company entitled "In a moment of time." It describes the writer's impressions of being bombed, and here is a quotation from it: "Turning towards the party wall between the rooms I distinctly and unmistakably saw the wall bulge towards me. The wallpaper and plaster gradually broke away, disclosing the bricks, which parted and fell into the room. I have the most vivid and lasting recollection of that taking place so very slowly that it appeared to me like a slow-motion picture." Yet, what happened then must have taken place in a split second. What a contrast that provides with our long drawn out formulation of a national fuel policy. After the war, that home will have to be replaced; after the war our fuel policy will have to be changed, and it is to be hoped that if it cannot be changed as swiftly as the home was destroyed it will not take years and years of argument to arrive at a rational policy of employing coal to the best possible advantage.

In spite of the tumult of war we must crystallize our ideas on the subject and have our notions of what should be ready to put forward with conviction to the appropriate quarters when peace prevails again. To this end we have published during the past month articles on post-war reconstruction which we know have created widespread interest, acting, as it were, as catalysts to thought. The letters we have received show clearly enough that the problem is exercising the minds of many of the most capable men in the Gas Industry, and that the desire does not exist to return to pre-war conceptions and pre-war muddle regarding the most fruitful treatment of the nation's most valuable asset, coal.

Before this war there was a great deal of overlapping and no little confusion in the fuel industry—a sort of cat and dog fight between four major fuels (coal, coke, gas, and oil) and electricity. which some think is not to be classified as a fuel, but as a source of energy. In any case, electricity is in this country generated from coal, so that its root is solid fuel. Lighting, we must admit—and largely through the apathy of the Gas Industry—was pretty well the domain of electricity. We turn to heating; whether the heat be required for cooking, the provision of hot water, or the warming of rooms and buildings of all types, small and large. The public had its choice of five fuels (we are including electricity), and the competition between them unquestionably made for better service, better appliances. Advertising and propaganda, though cut-throat, were very much alive and at times provoking and scintillating. The advent of war brought temporary "understandings" and temporary "truces"; but the fuel problem remains, and the situation to our mind is, beneath the surface, a trifle chaotic. The articles we have recently published have been designed to make us wonder what we are going to do about this problem. Not being omniscient, we are not prepared to solve it.

At the same time, it does seem to us that there has been too much overlapping and too little willingness to understand and appreciate the other fellow's point of view. Water, apart from a drinking medium, has no competitors. On the other hand, every fuel is virtually in competition. Every civilized form of warmth can be given by the five fuels we have enumerated, and every civilized form of lighting by three of them. To our mind each of these fuels has its rightful place, but to what extent each should be used for various purposes constitutes a complex question. As example, the Gas Industry, even to-day, has not made up its mind on the relative values of gas and coke. It has spent large sums in "pushing" gas; it has spent practically nothing in "pushing" coke. Yet, without the revenue from coke, we should hate to think of the prospects of the sale of gas. That is, of course, under present methods of gas manufacture; complete gasification may completely alter the picture. We hope it will; but that time is not yet economically with us.

We think that the fuel problem is one of allocation to be decided by co-operation, always with a view to the consumer's and not the supplier's interest. The only use we have for smoke is that it tells us in what direction the wind is blowing, but there are other means of finding out this. Therefore, in any new scheme, *a priori* smoke must be eliminated; and this, by the way, does not necessarily imply that raw coal shall not be burned. There are non-smoke producing electricity stations in this country consuming coal which, if carbonized in gas-works, would not yield the most efficient results. They are, unfortunately for the community and the nation, exceptions. Smoke must be eliminated (not "abated") in industrial and domestic premises. We need cleaner towns and cities in the coming era. Let us be agreed about this point.

So, for a whole host of purposes we must have recourse to smokeless fuels. Gas and electricity are smokeless; so are oil and coke if they are properly burned. And this brings us to the all-important question of "acceptability" between the various fuels. Apart from the matter of price, can it be said that gas coke is universally acceptable? Aware of the answer, we simply say that coke quality must be improved. That it has been greatly improved within recent years is common knowledge, but we have not gone far enough in this direction. Then we come to the basic consideration of economics. However acceptable a fuel, if the majority of would-be consumers cannot afford to use it, its application must be limited and a less refined but smokeless fuel will have to step in. It follows that the aim of any post-war fuel policy must be to give the consumer the best heat service at the price he can afford to pay, and this depends on co-operation between every fuel interest, starting with coal as raw material. This would seem to imply in the ultimate the allocation of certain specified fields of action for particular sources of light and heat; and this is going to be no easy task. Moreover, development is always in a state of flux. What may appear to be rational one year may, as a result of some startling improvement or some entirely new process or application, be quite out of focus the following year. Also, would this suggested allocation tend to slow down development? Would each fuel interest relax just a little in a state of security and guaranteed business? If such were the case, the scheme would not be in the best interest of the consumer.

Those are a few of the thoughts which spring to mind, and they warrant consideration. There is another factor which should be brought into play in any scheme of post-war reconstruction of fuel policy, and that is really effective co-operation between all fuel interests and those who are responsible for providing the community with healthy dwellings. We require closer contact with the architect and the builder, with the heating and ventilating engineer, and with the medical profession. For instance, in the issue of the *Builder* of May 2 there was an article

advocating central heating and the omission of flues. After the war there will be plenty of houses to build, and we cannot think that the erection of flueless houses would be a step in the right direction. This is one example only of many points on which agreement should be reached before new building schemes are launched. As we have said, post-war fuel policy presents a very complex problem, but it must be tackled. We must be ready with a new fuel programme on the declaration of peace.

BURNER RESEARCH

FROM time to time since the outbreak of the present war we have emphasized the need for continuing research on gas appliances, so that when peace is restored the Industry will be in a position to offer new and improved appliances of all kinds; and it has been gratifying to us to see that in many places in the laboratories of both gas undertakings and appliance makers such work is being actively pursued to the extent which war demands on man-power permit. We were getting into such a strong position prior to the war. Gas fires of revolutionary design and performance were being put on the market with full confidence. More and more was the consumer being provided with trouble-free apparatus embodying refinements such as automatic ignition and burners which would not light back—apparatus giving freedom from petty annoyances. Cookers, for example, were being marketed having burners ensuring improved flame stability at the low consumptions required for simmering, non-lighting back if the gas was turned on again just as the flame was going out, due to the user's change of mind, and non-lighting back when igniting arising from the application of the lighting flame before the burner was fully purged of air. Temporary lighting back was immediately self-rectified—a point of importance when an automatic system of ignition is employed.

On several occasions during the past few years we have referred in these columns to the excellent research work being undertaken in increasing volume in Australia, and among the investigations in progress by the Australian Gas Light Company at the present time is one on this very subject of non-lighting back burners. A short account of the results appeared recently in the *National Gas Bulletin*. While commending this work, we must admit we were struck with the lack of mention of what is being and has been done on the subject in England, and in particular to its practical application. As a matter of fact, non-lighting back burners—together with other refinements—were introduced by Radiation Ltd. in a highly practical form at the beginning of 1938 on their "New World" cookers, which were fully described in the "JOURNAL." Non-lighting back burners have since been incorporated in a number of later models. In this country the whole question has been studied with commendable thoroughness—from both the theoretical and the practical point of view; and it is obviously in the best interests of everybody concerned that the Australian researchers should be fully acquainted with the results of our work here. Equally important is it for us to keep in touch with research in Australia. Overlapping of research should be avoided by all possible means.

Our friends in Australia will doubtless be interested to learn that practical considerations here in this direction have necessitated a certain amount of compromise in order that a large number of smaller parts shall not be kept in stock. Because of this there has been introduced the principle of grading gases according to calorific value ranges, and of designing the essential parts of the burner system to meet the requirements of gases falling within these particular limits. Theoretically, of course, each gas supply should be examined and a specification drawn up of the most suitable size of injector orifice, choke, and burner dimensions. However, variations in the quality of gas do occur—even among undertakings supplying gas of the same statutory calorific value level. These differences make it necessary to choose some standard which will be reasonably satisfactory on all supplies. One has to have a measure of adjustment to cope with the aeration requirements of different gases. By the fitting of either a pressure governor or a pressure control, and by providing an adjustable choke, it is possible to regulate the burners to the conditions prevailing so as to attain the best performance. As with other burner systems, it is not possible in the present state of gas manufacture and supply to eliminate the use of adjustments, but by the attainment of improved working a better service is given.

In common with other appliances, the cooker was being vastly improved as a result of research and its practical application. Important investigations were in progress at the outbreak of war on grill frets, solid hotplates, and a host of other problems. Reduced research personnel has inevitably meant a slowing-down of the work, but, as we have said, its continuance at the maximum practicable stands out as a very real need, and we shall certainly follow with the greatest interest the valuable work being done in Australia.

Personal

Mr. J. L. THOMSON, of Kilmarnock, has been appointed Gas Manager at Newport, Fife.

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On May 24 Mr. R. C. PLUNKETT, Purchasing Officer to the Brighton, Hove, and Worthing Gas Company, will enter on his fiftieth year of service with the Distribution Department. He joined the Company on May 23, 1892, in the Mains and Services Section, and was transferred a few years later to Black Rock Works, where a new stores and fittings department was being formed. Here Mr. Plunkett served many years as chief assistant to the late Mr. C. H. Sandeman. Since 1921, in addition to being Purchasing Officer, he has acted as chief assistant in the Distribution Department—for some years to Mr. P. E. Browne, who is now Managing Director.

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Mr. R. M. JONES has completed 60 years' service, latterly as Distribution Inspector, with the Newport (Mon.) Gas Company. This makes a period of one hundred and ten years' service of father and son with the same Company, Mr. Jones' father having previously served 50 years as a lamplighter. Mr. Jones began his career at the Gas Company as a fitter's bag carrier at the age of twelve. He still remembers installing the first gas cooker in Newport, and that the householder required him to eat the first meal cooked in it in order to satisfy himself that the food was not contaminated in the process. He was one of the founders of the Wales and Monmouthshire Junior Gas Association. Mr. and Mrs. Jones celebrated their golden wedding last October.

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Mr. JAMES BELL, who has been Manager of Dumbarton Gas-Works for the past 25 years, has retired from his post, and the Town Council has appointed as his successor Mr. EBENEZER SMITH, who has been acting as Assistant Gas Manager.

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Birkenhead Gas Committee has accepted the resignation of Mr. W. T. HIRD, Distribution Superintendent, who has received an appointment at Sheffield.

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Mr. F. HALCROW, Assistant Distribution Superintendent of the Peterborough Gas Company, has been appointed to a similar position with the Oxford and District Gas Company. Prior to taking up his appointment at Peterborough, Mr. Halcrow was District Inspector with the Cambridge University and Town Gas Light Company.

Obituary

The Secretary of The Institution of Gas Engineers reminds us that Mr. P. C. HOLMES HUNT, notice of whose death we published last week, had been a member of the Institution since 1903, and that he was a co-founder, with his brother, Clifford, of the Charles Hunt Memorial Medals in the Diploma Examinations of the Institution, which were endowed to perpetuate the memory of their father, the late Mr. Charles Hunt, a Past President.

Institution of Gas Engineers

The following is the provisional programme of the Annual Meeting of the Institution, to be held on Wednesday, June 11, in London:

10 a.m.	Adoption of 77th and 78th Annual Reports and Accounts (Communications Nos. 228 and 238). Scrutineers' Reports of the Ballots. Presentation of Medals.
10.30 a.m.	Presidential Address by George Dixon, B.Eng., M.Inst. C.E., Engineer and Manager, City of Nottingham Gas Department (Communication No. 239).
11 a.m.	General Meeting of Contributors to the Benevolent Fund of The Institution of Gas Engineers.
11.15 a.m.	Presentation and Discussion of Symposium of Short Papers on the Gas Industry: 1941 and After (Communication No. 240).
12.45 p.m.	President's Luncheon.
2.45 p.m.	Discussion of Papers (continued).
4.45 p.m.	Concluding Business of Meeting.

National Gas Council

Meeting of Central Executive Board

A meeting of the Central Executive Board was held at Gas Industry House on May 13, under the Chairmanship of Sir David Milne-Watson, Bart., LL.D., D.L.

Resignation of Mr. G. A. Mallett.—It was stated that a letter had been received from Mr. G. A. Mallett, of the Ipswich Gas Light Company, intimating his wish to retire from the National Bodies for reasons of health. It was agreed that a letter be sent to Mr. Mallett expressing the regret of the members of the Board at his retirement.

Membership of the Board.—It was reported that Mr. R. J. Auckland had been appointed to represent the South Wales District on the Board, in place of Mr. H. D. Madden (resigned).

Urgency Committee.—Mr. S. E. Whitehead (Southampton) and Colonel W. M. Carr were added to the Committee.

Annual Report.—The draft Annual Report, as circulated, was approved, subject to one amendment.

Penalty for Deficiency in Calorific Value.—Correspondence with the Board of Trade was considered with regard to this question, and the opinion was expressed that it appeared unjust that a gas undertaking should be made to suffer where the deficiency in the quarterly average calorific value was due to circumstances entirely beyond their control, as was so frequently the case where coal of suitable quality was not forthcoming. It was agreed that representations should be made to the Board of Trade to this effect.

Tracing Addresses of Customers.—It was stated that a letter had been received from the General Post Office in reply to a suggestion made by the Conjoint Conference of Public Utility Associations that during the war persons who proposed to leave one district should register their new address with the Post Office before so doing. The reply stated that the Postmaster-General could not see his way to accept the suggestion.

Meeting of the Emergency Committee of the Conjoint Conference.—It was stated that a Report had been circulated on the various items considered by the Emergency Committee at their meeting on May 2 from which it would be seen that a variety of important questions had been considered. Among these were:

(a) Mains and Cables in Highways.—It was satisfactory to know that negotiations between the Highway Associations and the Conjoint Conference were to be resumed. The matter was in the hands of a sub-committee representing the three public utility interests, and it was felt that it could safely be left to them to deal with.

(b) War Damage.—It was stated that it was understood that the Government scheme for public utilities would be forthcoming in the immediate future. A small sub-committee with full power to co-opt experts had been appointed, and their first meeting had taken place the previous day.

(c) Reconstruction.—It was stated that members would see from the report circulated that the Conjoint Conference felt that at this juncture they could not usefully contribute any views upon the wide subjects which were being investigated by the Committee in question. At the same time, they proffered their assistance in the Committee's deliberations as and when their help was required.

Coal.—It was stated that the position with regard to coal supplies to gas undertakings still failed to show improvement. The seriousness of the position had again been emphasized to the Government, but so far without result. It was agreed that the Conjoint Conference should again consider the position with a view to taking further steps in the matter.

Date and Time of Next Meeting.—It was agreed that the next meeting of the Board should be held on June 10, at 12 noon.

American Gas Industry

A Call for Action

Last month the American Gas Association held conferences of its Distribution and Motor Vehicle Men. The following quotation is from the Address given by the President, Major T. J. Strickler:

"During your meeting here I am sure there will be considerable discussion of plans and methods that are under consideration should an attack come from without. As I have said before, I do not join with those who expect an attack from without in the very near future, but it would be folly for us to cover our eyes to what is happening elsewhere throughout the world, and merely say, 'It can't happen here.' Let us be far-sighted and not be caught napping. We should make every preparation possible for the protection of our plants and properties should an outside attack occur. Already a number of companies are working on plans that can be put into immediate effect should such an emergency arise. To some of you this may seem like a case of 'Wolf, Wolf,' but if you will stop and analyze what has taken place throughout the world you will realize that the time we spend now in such preparations may prove to be our most valuable asset at a rater date.

"We who are familiar with distribution problems in the United States have felt at times that our lot was indeed a difficult one. Supplies of gas sometimes diminish, floods occasionally raise havoc with our distribution systems. Major or minor mishaps are apt to strike almost any time. Yes, we have had some difficult problems to deal with during the past decade, but stop and think for one moment what the distribution executives in England have had to deal with during the past eight months. Theirs has been a second Dunkirk. How these men have carried on under such devastating destruction and continue to deliver gas service is a miracle that should, and probably will, be recorded in history. They have had to work out solutions as they went along. They certainly have our heartfelt admiration for the courage and initiative they have displayed during these trying months.

"How I wish that there were some tangible way that we, of the same profession, could help them in their grave hours of need. I do hope that they will take additional courage in realizing that the American Gas Industry was one of the first to offer its facilities for national defence and for use in the manufacture of war supplies for Britain, and for all other peace-loving democracies. We will do everything within our power to help supply them with the material that will mean their ultimate victory. The Dictators know well on which side of the fence the American Gas Industry stands. We will stay with our associates in the democracies until the very end.

"But mere words are not enough. Let us back them up with deeds. We should never allow ourselves to assume the attitude that what is happening to them can never happen to us."

Treatment of Tar Oils

The Midland Tar Distillers, Ltd., D. W. Parkes, and R. B. Evans have taken out a patent (No. 534,798; application date, Dec. 29, 1939) for the treatment of tar oils.

They point out that tar oils and particularly creosote are used extensively in disinfectants, and it is common practice when they are used for this purpose to incorporate soaps with them so as to form clear liquids which, on being diluted with water, produce white emulsions of the oil-in-water type. It is found, however, that these emulsions very soon turn pink or even red. This change of colour may occur after a period of only a few minutes. This coloration of the emulsions is disliked in the trade and emulsions which are more or less permanently white are much sought after. The patent is concerned with the production of such emulsions.

Various treatments have been tried by the applicants in their experimental work on the production of these emulsions. One method which was tried was to blow air through the oil in the presence of caustic soda in the solid form or in the form of a strong solution. After the residual soda and impurities had been removed by repeated washings with water, the oil was distilled and a product was obtained which was much more colour-stable than the untreated oil; emulsions formed with it turned pink but only after a much longer period than the few minutes referred to above.

Another treatment which was tried was to blow air through the oil in the presence of certain metal compounds, and in this way an improved product was again obtained. In neither of these two cases, however, could it be said that an emulsion could be produced which remained white for more than a relatively short time. The two methods also had the disadvantage that a highly coloured, bulky alkaline effluent was formed which was of such a nature as to preclude its being disposed of by being run to waste through the sewers. Moreover, the yield of the finally desired product is not very good.

It has finally been found that very good results indeed are obtained by combining the two methods set forth above—that is to say, by air blowing in the presence of a strong alkali, such as caustic soda and an oxide, oleate, or naphthenate of cobalt, chromium, manganese, iron, nickel, zinc, lead, or copper. This treatment allows products to be obtained with which aqueous emulsions can be formed which remain white after very long periods indeed and which, if they do change colour at all, only do so to so very slight an extent as to make them unobjectionable in the trade. The treatment in accordance with the invention also has the advantage that a solid residue is formed which can be easily separated and disposed of. Also, the yield is quite high.

The treatment can be carried out at atmospheric pressure. The temperature at which it is carried out has no very vital effect on the nature of the final product, but it is found that slightly elevated temperatures have the advantage of accelerating the treatment. Any temperature between 70° and 120°C. gives good results. The air blowing will, in general, be continued for from 18 to 24 hours, according to the temperature and according to the materials which are used. It may, however, last considerably longer than 24 hours. Where the metallic compound is an expensive one, it is best to use less of it and to lengthen the blowing period.

Other alkalis than caustic soda can be used. Caustic soda has, however, the advantage of being quite cheap.

Wales and Monmouthshire Association

The Annual Meeting will be held at the Park Hotel, Park Place, Cardiff, on Thursday, May 29.

The formal business meeting will begin at 12 noon and the meeting will adjourn for lunch at 1 p.m. At 2.30 the meeting will be resumed, when Mr. W. H. Johns and Mr. F. Boardman will present Papers giving information concerning air raid damage. A discussion will follow.

Like All Good Citizens, Mr. Therm assisted whole-heartedly in Hastings War Weapons Week. He appeared at the local showrooms, waving a Union Jack, on the nose of a huge German bomb which had actually been found in one of the Company's gasholders after a raid, and invited contributions to the fund.

RESEARCH AND THE COKING INDUSTRY

Discussion on Paper by Dr. E. W. Smith to the Institute of Fuel on April 30.—See "JOURNAL" of May 7, p. 237.

Mr. **H. Clifford Armstrong** said that from his own experience he was bound to agree with what Dr. Smith had said. There was no subject to which more lip service had been paid than the question of research. One had only to mention research and everybody began to put his hand in his pocket and get out a cheque book and say "How much do you want?" Not only were there Research Associations, but individual undertakings were carrying out research on their own account, and the results of a good deal of this research were never made available to industry generally. Were they ever going to get over this truly British jealousy of the industrialist, and the fear that if he were to find out something and tell his competitor it would cause him to lose something in the battle of industry? That was one of the greatest bugbears at the present time. Due to this state of affairs it very often happened that the research department of one firm might find out something which it thought very valuable, only to find out at some meeting that somebody else had done it before. That was where he thought our present ideas with regard to research failed. Were there really a sufficient number of the right men in the country to carry on such a large number of different researches? Surely it would be better to pool resources far more than was done at the present time. Naturally, industrialists must carry on research into problems which were individual to them, but so many of these problems were of major interest to the whole of industry and some means should be devised for pooling knowledge. By all means have Central Associations, but these Central Associations must get away from the habit they now had of advertising themselves. He had in mind the academic people, a large number of whom, when they were carrying out research, felt they must write Papers and use very long words, and the more they muddled the ordinary person the more they thought they must be wonderful. Moreover, if the coking industry was going to have research, keep it away from the Government. He did not know of anything worse than an example in his own special line of work—viz., Government fuel research—and especially the way in which they issued their reports. He had occasion a few weeks ago to write to the Fuel Research Board for the Report for 1939, and the reply was that it would be sent to him as soon as it was published—the Report for 1939! These Reports were always published at least 12 months behindhand. It was no good being asked to do something and to deliver the goods, and then say it was hoped to do so in 12 months' time. That would not do in business, and it should not be the case in research. Therefore, he did not think the coking industry required anything on the lines of the Fuel Research Board.

Research people in the industry must be constantly in touch with users and the industry. That was where local industrial research organizations would play, or should play, such an important part, because they would know the actual problems which had to be faced. He claimed to be one of the pioneers of the use of coke oven gas in the Sheffield area, and he believed, more than ever, that there was an enormous future for the solid fuel itself. With the problems which would be coming up fairly soon, there would be required in Sheffield large quantities of coke, amounting to several hundred tons per day. It seemed extraordinary, therefore, that it would be necessary to go to the North of England for it. There was a matter for research in that connexion. He had been told that the reason was largely one of size, and that it would upset local trades and so on, but it did seem strange, at a time like the present, that they should have to depend on railway transport. That surely was a matter which needed investigation.

One of the most interesting things Dr. Smith had mentioned was the centralization of the fuel industry. It should be possible to have our blast furnaces, coke ovens, and chemical works on a central spot.

Dr. **E. W. Smith** felt that research Associations would have to continue to advertise while the voluntary system was in being.

Mr. **N. E. Webster** (Nunnery Colliery, Sheffield) said the Paper dealt with one of the most serious positions the coke trade was likely to find itself in in the immediate future. It had been suggested that attention would have to be paid to research in many different directions. One of them had already been tackled, and that was further investigation into the Fischer-Tropsch process, for the specific purpose, presumably, of finding another market for coke. There was also the alternative of producing the liquid fuel which they so badly needed in this country. It had also been stated that the revenue from coke ovens was very largely dependent on the receipts from the sale of coke. Mr. Armstrong had followed that with a line of thought which was somewhat akin, for he wondered whether, after the war, his gas supplies would be easier for the reason that it might not be possible to sell the amount of coke which was being produced. Those who had had their attention drawn to this question of additional outlets for coke were particularly anxious that research should be carried out into all possible outlets. He suggested that the revenue being received from by-products was practically stationary and that forced any increase in the price of coal to be unloaded in the price of coke. Therefore, it was essential to carry out research with a view to ascertaining whether or not it was possible to derive a larger revenue from the other sidelines, if they might be so termed. Dr. Smith had suggested that the Fischer-Tropsch process might be a solution. A number of the members were not unaware that a company was formed by the Yorkshire coke owners for the specific object of absorbing the surplus coke which was contemplated as being a probability in the future.

Dr. **Smith** said he entirely agreed with everything the last speaker had said. The position of the Government control of prices and the line up as between coal and coke and the line up as between coal and gas was entirely illogical and should be adjusted.

Mr. **R. H. Clayton** remarked that small firms with big problems could not tackle them except by combined research. There were two kinds of coke ovens in this country—viz., those belonging to the ironmasters, who looked after their own interests, and those belonging to other than ironmasters. It was these latter who would be left in a very difficult position after the war if co-operative research was not embarked upon. The coke oven gas industry was the Cinderella of the coking industry, and in his view the prices paid by the Grid to the producer should be split into two parts. There should be a lower price where there was competition with the solid fuel industries, and a better price should be charged to the distributors of gas in cities where the consumers could well afford to pay more than the miserable 6d. Some scheme should be worked out on these lines. Then there was the point of view of smoke abatement. A great deal was heard about this after the last war when they were supposed to be building homes fit for heroes to live in, but there would have to be a much greater campaign after this war in the direction of smoke abatement. Many of the houses built by local authorities were in a miserable condition after a few years due to the polluted atmosphere. He suggested that research should be carried out to provide a coke which would suit the domestic market.

Another point arose in connexion with the fires used for burning coke. In his view the design of these fires was entirely wrong and the reason was that they were too cheap. It was possible to buy such fires for about 15s., and they were thoroughly inefficient. The only way it was possible to keep such fires in was to have them a terrific size so that they could be fired with sufficient fuel to last for three or four hours. Would it not, therefore, be advisable to appoint a Committee to evolve a really efficient firegrate for coke oven coke?

Dr. **Smith**, speaking of the general position, said it would be necessary to recognize the fact that unnecessary competition must be eliminated, because that had been responsible for most of the mistakes in the past. There would have to be a liaison between the chemical, gas, and coking industries, and not for each of them to be playing for position.

Mr. **J. G. Bennett** (Member of Council) remarked that Mr. Clayton had referred to some vital problems for one big section of the coke oven industry, but as one interested in coal utilization research he felt that if a problem was vital for one section of the industry it was vital for the whole of the industry. One side of the fuel industry could not prosper without another.

Personally he was interested in the activation of coke and also coke-burning appliances, but it seemed to him there was a tendency for the coking industry to forget that it was not the only industry or the only people to carbonize coal. As a matter of fact, the domestic user carbonized all the coal that he burned; the power stations carbonized all the coal they put on their chain grate stokers; all the coal that went into the boilers on the railways was carbonized, and all this was a very important thing which must not be lost sight of, for coal could not be burned, as far as he knew, without having gone through a temperature at which it would carbonize. There was a great fundamental connexion between processes in which coal was carbonized for use later on, and processes in which coal was carbonized and burned at once, and this was being realized more and more. It was the carbonization behaviour of coal that really governed its combustion, and therefore research into the combustion of coal made it indispensable to study and understand as much as possible the carbonization of coal. The volatile matter that was evolved from the coal and also the coke had to be burned, and the study of the reactivity of coke and the conditions which it would produce in the fuel bed were vitally important.

He was very much in favour of the use of smokeless fuels in the domestic grate, and this brought up the question of activated coke. That, however, was bound to be an evolutionary process, and it would be a very considerable period before 20 million tons of coke were absorbed in private houses. In the meantime, it would be necessary to burn coal as smokelessly as possible, and that turned on the way in which the coal was carbonized in the open fire.

Dealing with the alkali activation of coke, Mr. Bennett said his Association had been particularly interested in this because they were asked right at the beginning of the war by the Government to see if it were possible to develop a small gas producer for running road transport, in case a shortage of petrol occurred. The question was examined in the autumn of 1939, and the review of the position indicated that any large-scale development of road transport along these lines must be based on coke. It was out of the question to use coal or anthracite in the raw form because the cleaning problem would be too acute. Moreover, the use of low-temperature coke was not quite as attractive as it looked at first sight, for the reason that when low-temperature coke was raised to a temperature of 950°F. for very long it ceased to be a low-temperature coke, and it was raised to that temperature in the gas producer with the result that the benefits of

low-temperature carbonization were quickly lost. Therefore, they came to the conclusion that it was necessary to use ordinary coke, and an investigation was carried out to see if this could be adapted to the requirements. The reactivity of coke—a property which it was not very easy to define, but which was well understood by every one who dealt with carbonized fuels—was an important factor, and unless the coke had a reactivity—measured by what in his view was the most satisfactory measurement available, the critical air blast test—of about 0.03, which was not an easy thing to do under high-temperature carbonization conditions, it did not give the flexibility required for operating small gas producers running on the roads. On the other hand, it was found that "Dryco" made by the Liverpool Gas Company, if treated with sodium carbonate before carbonizing, had the required activity to give the results wanted. However, the I.C.I. saw a potential market for sodium carbonate, and legitimately spent a good deal of money in trying to develop the process and to encourage its use. As the result of this, alkali activated coke was developed, but it was not until January, 1940, that the I.C.I., working at Winnington, found that instead of having to add sodium carbonate, together with lime, to the charge before carbonizing, it was possible to get equally satisfactory results by drying the coke and adding sodium carbonate after carbonizing. This had the advantage that it was possible to treat the various sizes of coke according to requirements. Furthermore, it allayed the fears of gas engineers that their retorts might be damaged by the treatment of the coal with sodium carbonate if it were added before carbonization. It had been discovered that it was possible to make an effectively reactive coke by spraying coke, already made, with about 1½% of sodium carbonate, and this had made an immense difference to work of developing the small gas producer for road traction purposes. He believed he could now say there was a real hope that this had a commercial future. Mr. Bennett added that if 60,000 vehicles—which was about 10% of road commercial transport in this country—were converted, they would require something like one million tons of coke a year. It was, therefore, an interesting market meriting active interest on the part of the carbonization industries.

With regard to the question of grates, and why they were not better, the point was that coke would not burn unless it were reactive enough unless burned up to a certain rate. That was exactly what reactivity was. Therefore, it could not be expected that a non-reactive coke would burn in a very small grate. There were various ways in which coke could be disposed of in the domestic market. If they were prepared to compete with the use of gas for cooking, there was no question at all that efficient cookers could be made to burn coke. The use of coke for large scale institutional cooking and for catering cooking was, in his view, the obvious thing of the future, whether the Gas Industry liked it or not. Although very large numbers of big gas cookers were being used, coke cookers which were now being developed on the gravity feed principle were very much more efficient and very much cheaper to run. Furthermore, they produced very much more attractive food because the food did not come into contact with the products of combustion. He believed that that type would sweep the market.

If it were desired to use coke in the open fire, he did not see how it was possible to avoid the issue that the coke must be highly reactive. It might be that this would have to be left to the Gas Industry because, perhaps, it was only in the Gas Industry, using continuous vertical retorts, that it was possible to get a highly reactive coke suitable for the purpose. There was here a problem which all were interested in—viz., how to provide the country with cheap conditions for heating and cooking, the provision of hot water in domestic houses, and so on, after the war. This would have to be done much better than anything of the kind in the past, and personally he was quite certain of the enormous role which coke would play in this development. It was also necessary now to determine what sizes of cokes were going to the various markets and the appliances to be used. In all this he felt they should work together and help one another.

Dr. **Smith** said that so far as his knowledge of the Gas Industry was concerned, nothing would please him better than to see a big expansion in the use of coke. It was only by a constant demand for coke that gas could be produced at a reasonable price. It was no use having a lot of coke sold at a low price and gas at a high price. If the price of coke could be enhanced, due to improvements in its preparation, then it would be a great advantage to the Gas Industry. There were some who said the Gas Industry should go all out for gas, and not worry about coke, but in his view that was wrong.

Mr. **C. J. Bradley** (Coke Oven Managers' Association) said that Dr. Smith had crystallized the views which many in the industry had held for some years. For too long the coke oven industry had been the Cinderella of the coal industry, with the result that there had not been the progress in it and in the allied industries there should have been. The whole structure of the industry needed to be reorganized, and it must be got on to a fundamental basis not only for selling but also for the conduct of research. There must be some fundamental organization in the industry, and a scheme by which it should be run must be devised before any of the suggestions made by Dr. Smith could be carried out.

Dr. **R. A. Mott** said it was common knowledge that the standard of fundamental research done in this country was probably as high as in any country in the world. With regard to what might be termed applied research, it was probably true that we in this country lagged behind the Germans and the Americans to some extent, although that was due to the absence of the co-ordination which Dr. Smith had mentioned. The question was how could that co-ordination best be brought about? The first step necessary was to devise a national fuel policy. The National Fuel and Power Committee in its day made some most excellent suggestions, and he believed the time would come, after the war, when a body, perhaps a little more comprehensive than that one, and perhaps called the National Fuel Committee or something of that sort, would be formed to give guidance to the different industries, which would be extremely useful. Research was primarily a matter of finance. It was not always very easy to get money out of people, but he believed it would be a little easier to get money for research if there were recommendations from some superior body of the need and necessity for work being done on certain lines. The iron and steel industry had a form of research organization with a number of Committees making recommendations to the different branches on what work should be done, which was excellent. If recommendations came from a National Fuel Committee that would carry considerable weight. Another matter which influenced the question of carrying on successful applied research was that the work should be understood. Mr. Armstrong had mentioned the habit of research workers not expressing themselves in language which could be understood by those who were responsible for finding the money or directing policy. Then the question of the status of the coke oven manager was an important one. He desired to have security so that he could give his interest to matters of policy which were often concerned with research. Further, the whole problem of research was associated with the technical standing of the men in the industry, and the Coke Oven Managers' Association had done very wisely in insisting on a high standard of training, and encouraging the younger members of the industry to attain a standard of training which would enable them to know what research was.

Continuing, Dr. Mott made a suggestion which he hoped the Coke Oven Managers' Association would bear in mind, and which he thought might enable things to be started; the Association should form, in each of its branches, a Research Sub-Committee which could undertake some of the matters referred to by Dr. Smith. A most important thing was to see that the data which the men in the industry recorded was all recorded in the same way. It was desirable to have standard methods of recording coke yields, methods of analysis, and so on. There were a number of such matters which these Research Sub-Committees could deal with. In his view, many people were wrongly informed as to the tremendous slump which some expected after the war. People were badly informed as to the coal and coke making capacity of this country, and were entirely concerned with the loss of markets which they would sustain after the war. Without going into that matter in greater detail at the moment, he suggested that a useful start could be made by carrying out the suggestions made by Dr. Smith.

Dr. **Smith,** speaking on the question of the language used by some research workers, recalled asking an important industrialist many years ago why he had made certain appointments. The man who had been appointed to take charge of the particular research department had never been in the organization before and had never been in contact with the industry before. The industrialist told him that during the previous 14 years he had had two men of the highest repute in Great Britain looking after the research organization. The Board of the Company used to ask for reports, and although these reports were complete they never contained a recommendation which was clear cut. As to the new man, who had been in charge for only 12 months, the industrialist said that when a recommendation was asked for he got it in clear-cut language.

Mr. **G. J. Greenfield** agreed with previous speakers that research was necessary, but said the whole point was what was going to be done about it. Dr. Smith had referred to research as being the toy of a successful undertaking, but that should not be. To some extent it was true that research was carried out within the industry by successful undertakings, and money had been spent in the hope of getting something back for it. It had been said that coke was the most important product, but he did not agree. The object of a coke oven plant was to make money, and if it were possible to make more money by turning out less coke, then it should be done. It was essential to take into consideration the by-products, and that brought out the fact that the industry was a chemical industry. As a matter of fact there was collaboration in research in the industry to-day. There was collaboration between the Fuel Research Station, the Coke Committees, and the Coal Utilization Research Association with the coal trade, and it was all to the advantage of the coking industry that there should be similar co-operation on its part. During the year in which he was Vice-President of the Coke Oven Managers' Association there was a move for research into smokeless fuel, but it fell through.

Continuing, Mr. Greenfield said he would like to give two thoughts arising out of his recent work, which had a bearing on this subject. He was interested in benzole, and in the case of a plant where the benzole was good, it almost invariably was the case that the manager had been allowed to spend a reasonable and satisfactory amount on maintenance—not only on the maintenance of the benzole plant, but the maintenance of the plant as a whole. It was like everything else, if one desired to make profits it was necessary to spend money. His other thought related to the value of chemical engineering research quite apart from coke research. It had come to his notice recently that quite a number of plants had wash-oil coolers where the oil was flowing in viscous or straight-line flow and where, therefore, it could not be expected to get efficient heat transfer. The researches of chemical engineers in this and other countries had shown the conditions in which liquid fuel would flow in straight-line flow or turbulent flow. The results were valuable, and he was surprised they had not been more applied than they had been.

SOCIETY OF BRITISH GAS INDUSTRIES

REPORT OF THE COUNCIL FOR 1940–1941

IT is with the greatest pleasure that the Council is able to announce that Sir Francis Joseph has very kindly consented to serve as President of the Society for a further year.

On the outbreak of war the Council decided that the affairs of the Society would be best conducted by an Emergency Committee, with power to co-opt, and this Committee has met at regular intervals throughout the year. The Council has been kept fully informed of its work and decisions, assisted by such consultation from time to time on specific points as has been necessary. With the full approval of the members it was decided not to hold the normal elections of Council and Officers for which the Rules provide, and a "standstill" arrangement to give effect to this was passed by resolution at the Society's Annual Meeting in 1940.

The Gas Industry

The year under review has witnessed the transition of the Gas Industry from a peacetime to a wartime basis, with extensive effects on the business of the Society's members, and in consequence on the part which the Society has been called upon to play. In one very important respect, however, the Gas Industry has been fortunate, in that in the years immediately prior to the outbreak of war, faced as it was with the keenest competition both in the domestic and industrial fields, steps were taken to consolidate the Industry's internal position, and this machinery has stood it in excellent stead in the past year. The channels for internal consultation and co-operation if not precisely defined at least had the merit of flexibility and were therefore the more readily adaptable to a set of circumstances which they had not been specifically designed to meet. The machinery was in existence and the goodwill so necessary to its easy functioning was also there. They have proved of great value in dealing with a wide range of problems, with a few of which, and then only in summary, this Report deals.

The internal development which has probably more than any other led to a complete reorientation of the position of industry during the past year has been the introduction of Control, and in particular so far as the business of the Society's members with Gas Undertakings is concerned, the control of steel, castings, and non-ferrous metals. Early in 1940 the Society, based on information supplied by members, submitted an estimate to the Board of Trade of the steel requirements of firms supplying the Gas Industry with plant, equipment, and appliances. In the spring there came into force a Scheme for the Distribution of Steel Supplies, and the needs both of Gas Undertakings and of Contractors and Manufacturers which supplied them were provided for under Symbol B.T.1, the Gas Administration Dept., Board of Trade, being the responsible authority. This scheme quickly emerged from its trial period, and having been brought up to date in the light of experience is now generally accepted as a practical way of assuring that the best use is made of the national steel supplies. The Society has had occasion to make representations on a number of questions arising from the control of raw materials, and in many ways both officially and unofficially its views and assistance have been sought. This much can be said at this stage: first that the position of the Gas Industry as a large and important user of steel has been established, and secondly that there is every evidence of a desire to use the wide power which Control gives, wisely and with proper consideration of the present needs and future development of the Industry.

In addition to the control of raw materials, there have been further and in many cases drastic restrictions on the production of consumer goods, and in these cases, too, the Society has maintained close contact with the Government departments concerned and has been able to ensure that at least the Industry's position has been fully considered, even if urgent reasons of national importance have had to prevail in many of the decisions reached.

Home Trade

The Society, recognizing the new situation caused by the control of raw materials, has set out to do its utmost to assist in their being utilized to the best advantage, and with this end in view the Council has placed its organization at the disposal of Government Departments and of the National Organizations representing Gas Undertakings. Two notable instances might be quoted to show the way in which the services the Society has to offer have been used. A Committee set up by the Ministry of Mines submitted in the early part of the year a report urging the maximum possible recovery of benzole, and all statutory gas undertakings and all recovery coke ovens were asked to co-operate. The Society was asked to nominate a representative to serve on the Advisory Committee then set up by the Mines Department, and this Committee approached the Society to assist in the increased production of benzole by seeking the co-operation of the makers to achieve some measure of standardization of benzole recovery plants, more particularly in the smaller range of sizes. In the result three such sizes of designs approved by the Advisory Committee were quickly made available, and thus an important impetus was given to this urgent national task. The Advisory Committee and the makers, through the Society, are continuing to work in close collaboration. The second example of the use of the Society's services has been a successful approach to a serious problem which arose as the result of damage caused by enemy action. In this case the Society was asked to enlist the support of its members concerned to carry out work of a specialized nature with the greatest possible expedition in the national interest. The necessary productive capacity was very quickly placed at the disposal of the Gas Industry, questions which would determine the speed with which the work could be carried out were settled, and machinery was created to deal as effectively and expeditiously as possible with similar difficulties in the future. The Council is confident that in pledging the full co-operation of the Society's members in all matters affecting the maintenance of an essential public service, it will have taken the action which the members would have wished it to take, and indeed such success as it has been possible to achieve has been due wholly to that co-operation being forthcoming.

The state of national emergency has inevitably restricted the business of the Society's members in the Home Market in many directions, but it has been notable that despite the great difficulties, and particularly on the appliance side of the Industry, with which many members have been faced, the requirements of the Government and of the Industry have been met with the same efficiency which has characterized production in normal times.

It has seemed to the Council that such limited production to meet the needs of the Gas Industry as was permissible was dependent essentially on two factors, the availability of materials and of labour, and throughout the year therefore the Council's efforts have been concentrated on these two questions, and on the importance in relation to them of establishing the national importance of the Gas Industry as a vital industry.

Export Trade

In the Spring the Board of Trade sought the support of Trade Associations for the drive for exports which was proposed. The Society responded promptly and application was made to the Export Council for the formation of the Gas and Coke Oven Industries Export Group, which was divided into three Sub-Groups covering respectively Gas and Coke Making Equipment, Gas Appliances, and Gas Meters. Membership of the Group and its Sub-Groups is not confined to S.B.G.I. Members, though of some 75 firms engaged in export trade which have joined the Group, over 90% are S.B.G.I. members. Raw material returns and allocations for the members of the three Sub-Groups are handled by the Society's Secretary in his capacity as Secretary also of the Export Group, under authority of the Industrial Supplies Department, Board of Trade. Each Sub-Group has its own Chairman and Secretary. While inevitably the quantities of raw materials available for the Export Trade are governed by overriding national considerations and the importance attaching in the mind of the Government both to particular markets and products for export, it can be said that the formation of the Export Group has placed the Industry in the most favourable position to benefit from the facilities available to exporting firms. The initial benefits resulting from the Group being in the first list of those formed have been fully maintained.

Research

When reporting to the members a year ago, the Council recorded the part played by the Society in the formation of the Gas Research Board, on the Council of which the Society has six nominated representatives, and since the 1st Annual Report of the Board was made available to all members of the Society, the work and developments covered by that Report are already on record. The Board has been able to assist Government Departments in many directions during this time of national emergency, and while fundamental research work is being continued, in certain directions inevitably its tempo has had to be slowed down. A research programme to-day, however, can only be seen in true perspective against the background of the times through which we are passing, but as the result of the formation of the Board not only has the Gas Industry achieved that status of equality which it sought in regard to research, but it has at its disposal an organization whose value will be more evident on the return of peacetime conditions, when reconstruction as the product of research will be a vital need.

General

While it is difficult to discriminate between a wide range of questions with which the Council has dealt in detail during the year, the following matters of particular importance might be referred to by name, if no more: Limitation of Home Supplies in Consumer Goods; Purchase Tax ; War Risks Insurance Act; War Damage Act.

The Council has maintained the closest and friendliest relations with Government Departments in so far as their responsibilities affect the interests which the Society represents, with the other national organizations in the Gas Industry, and with kindred organizations such as the Federation of British Industries and the British Standards Institution. Through these channels and through all other channels

(*Continued on p. 315*)

open to the Council, every effort has been made to look after the interests of the Society's members during a year which has been marked by changes in the economic and industrial life of the country which are probably without parallel.

The ways and means which are open to the Society in normal times for consultation with its members and their elected representatives have had perforce to give place to methods of handling a wide diversity of problems more suited to the circumstances and realities of a country at war. Executive authority has devolved almost entirely on a small Emergency Committee, which has met at regular intervals throughout the year and has kept under constant review the business of the Society's members, and the incidence on it of constantly changing conditions and circumstances. The Council is confident that members will appreciate the services thus rendered to the Society by the Emergency Committee, and also the services which individuals have rendered in connexion with specific questions of general importance and concern to different sections of the Society.

In fulfilment of their declared intention, Government Departments are regarding and using the Trade Organizations of the country both as their channel of contact with Industry, and as the medium through which Industry can make its views known to them. Since individual representation has given way to collective representation in many phases of industrial activity, and since the Society is called upon in consequence to assume increasing responsibilities, the Council, in submitting this short summary of the Society's activities during the year, would ask that the members should give the Society in full measure, as they have done in the past year, their continued and loyal support. It can definitely be said that the Society's position is now clearly established, and the Council is confident it will be evident to the members it is both in their interest and in the national interest that that position should be maintained.

On behalf of the Council,

ERNEST WEST,

April 3, 1941. *Chairman.*

THE STEEL POSITION TO-DAY

[By a Special Correspondent]

THE Gas Industry is vitally concerned in the steel position from many aspects. Apart from this, general interest justifies us in giving space to this article, which has been placed at our disposal by the Iron and Steel Control.

Of the major steel powers the only one which still issues statistics is the United States of America, and according to the latest figures American steel production this year will be in the neighbourhood of 87 million ingot tons. In 1937, a year in which the industry generally was running at a high level, Britain produced approximately 13 million tons of steel and Germany 19,500,000 tons. When Mr. Roosevelt spoke of the United States as the arsenal of Democracy, he might also have called it the steel reservoir of the civilized world.

The events of last June placed under Germany's control the entire iron and steel production of the Continent, with the exception of European Russia. Before the war France, Luxemburg, Belgium, and Italy produced approximately 16 million tons per annum. If this be added to Germany's production (it is extremely unlikely that Germany is obtaining maximum production from the unwilling industries she has overwhelmed), and allowing for every possible effort on the part of Germany to step up German production, and not taking into account the frequent visits paid by the R.A.F. to Goering's key centres, the total production at Germany's disposal does not exceed 45 million tons.

Clearly, therefore, Britain and friendly non-belligerent America with a joint potential output of about 100 million tons of steel per annum have no need to fear a steel race with the Axis. One further word on this point: Japan in 1937 produced roughly 6 million tons of steel. Without importing considerable quantities of steel continuously, Japan is not in a position to wage war as a first-class power. When she waves a sabre in the Far East, it should be remembered that, unless she has discovered some hitherto unknown supply of steel, her armaments industry is more likely to produce swords than modern tanks.

At the present time, it is believed that Britain's steel capacity is in the neighbourhood of 14.7 million tons per annum. This is not sufficient to support all the demands made for steel by the Services and essential industry, and the Iron and Steel Control has been importing finished and semi-finished steel in considerable quantities from America for some time. This imported steel has been to a great extent put aside in this country as a reserve against emergency, and on that score the position is extremely satisfactory. Overseas trade returns for 1940 show that imports of iron and steel manufactures in the 12 months total £45,350,989, compared with £17,620,855 in the previous year, while in the same period imports of iron ore and scrap increased from £9,699,807 to £16,555,718. These figures should lead to some heart-burning in the Hermann Goering camp; even Goebbels will have some difficulty in convincing German steel manufacturers that the Nazi sea campaign is achieving a perfect blockade of this country.

All this is very heartening, but is there a reverse side of the penny? What, it may be asked, about the interruption of production in this country by enemy air activity? Are the workers standing up to the strain of working 21 shifts a week against the pre-war 18? Are the resultant steel supplies being allocated economically and efficiently? For convenience let us mark these questions (*a*), (*b*), and (*c*), and deal with them in that order.

In the case of (*a*) the answer is that the British steel industry, thanks to an efficient "Jim Crow" system which was generally enforced some time before air raids began in earnest, and the resolute attitude of mind of the steel workers, has lost the minimum amount of operational time. A tribute should be paid to the courage and tenacity of the steel workers who, in continuing their work during alerts, and even in some cases during actual raids, expose themselves to great danger. As one foreman expressed it, "Working in a steel mill during an air raid is like sitting on top of a landmine which is apt to do three things simultaneously—explode, pour molten metal over you, and release tons of deadly gas." To say that these men are front line workers of industry is an understatement; they are front line heroes.

(*b*) According to Mr. John Brown, Chief Labour Adviser to the Iron and Steel Control, additional hours of work have not affected the workers' health. Owing to some extent to blackout conditions and consequent increase of heat and absence of fresh air, there has been an increase in heat sickness, but only to a very slight extent. It was more noticeable during the particularly severe winter of 1939–40, when the men were not accustomed to the new conditions under which they had to work. There has been no serious shortage of skilled labour, as the men themselves undertake the task of teaching less experienced hands. As to some extent work in the steel trade is a family matter, handed on from father to son, newcomers are as often as not relatives. Even when women are engaged to perform certain tasks for which men are not essential, preference is given to the women relatives of steel workers. One feature of the industry has been freedom from absenteeism.

Question (*c*) was concerned with whether steel was being allocated efficiently and wisely. The answer is of vital importance because the organization and distribution of steel supplies is the fulcrum on which our entire industrial war effort rests. Fortunately, our iron and steel industry was, even before the outbreak of war, one of the most tightly knit and well controlled organizations in the country. During the past decade great steps towards rationalization and re-organization of the industry had been taken by the British Iron and Steel Federation under the Chairmanship of Sir Andrew Duncan. At the outbreak of war a complete statement listing the allocation, capacity, and current performance of every furnace and rolling mill was placed at the disposal of the Iron and Steel Control by the British Iron and Steel Federation. This enabled the authorities to switch over the industry to a wartime footing overnight, whereas this position was only achieved in the last war after nearly 18 months had elapsed.

The importance of this information can best be gauged by considering the fact that in wartime the State requires for armament purposes hundreds of different kinds of steel in a wide variety of shapes and sizes. The over-production of one, or the under-production of another, can reduce an armament programme to chaos. Synchronization of all this varied production is the supreme concern of the Iron and Steel Control, which is a Department of the Ministry of Supply. The Control itself is a good example of the efficiency which can be secured by blending technical and administrative experience with the authority of a Government Department. Distribution is effected through the Distribution of Steel Supplies Scheme, which entails the employment of a rather formidable system of forms and licences, but enables the authorities to keep a finger on the pulse of the steel industry all the time. The scheme has been accepted with a very good grace by steel manufacturers and consumers, who appreciate that no other mechanism would be adequate. It was amended and simplified after six months' operation and to-day there is little, if any, use of steel except for absolutely essential purposes. The construction of cinemas and all other unnecessary buildings has entirely ceased; civil consumption has been cut to the bone, and Form "M" has to be obtained from a Government Department and filled in by all consumers of steel. The steel so obtained comes out of one or other of the Government Department's allocation, of steel and must be authorized by the Department concerned.

For convenience sake each department has its own symbol; for example, the Board of Trade, which is responsible for civil consumption and export, has the symbol B.T. In the same way the Admiralty is A.D., the War Office, W.O., and so on. The amount or ration of steel allotted to each Department is agreed by an inter-departmental committee, called the Central Priority Committee. A symbol, therefore, must be quoted with all orders placed with steel works, and this automatically places the responsibility with the department whose symbol has been used. The information so obtained enables the Iron and Steel Control to keep a tight grip on the use of steel for all purposes whatsoever, co-ordinate production, so that all proper demands are met, and guard against waste of time and man-power when both are so precious, and plan for the future. This last is done by stating on every authorization the period (quarter) during which the steel must be delivered, even a year or 18 months in advance.

The use of the word "priority" is apt to be rather misleading, as in actual fact the important thing is the agreed allocation of total supplies. For example, at first glance one might conclude that the supply of

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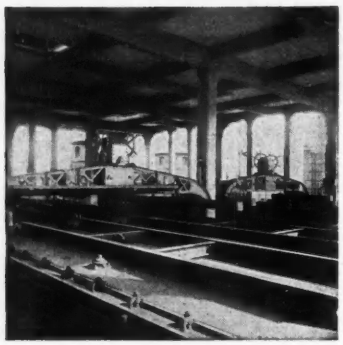

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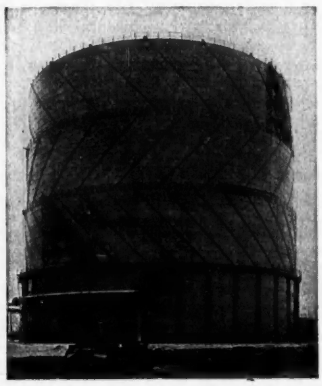

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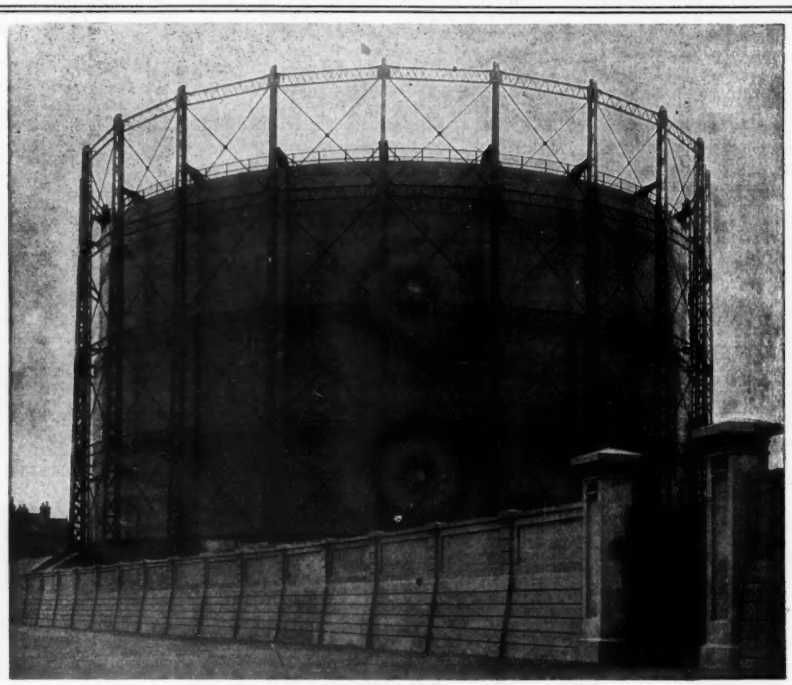

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steel to the Ministry of Aircraft Production for the construction of aeroplanes should take precedence over the supply of steel to the makers of motor car spare parts, but that this is not the case is shown when one realizes that the needful materials are frequently taken to the factories by motor transport. The Central Priority Committee should really be called the Synchronization Committee.

The answer, then, to the third question appears to be emphatically "Yes."

THE VEGETATION METHOD OF LOCATING GAS LEAKS*

By MILTON W. HEATH

President, Heath Tree Service, Inc., Wellesley, Mass.

EARLY in the last decade, a very severe winter was experienced in New England, and some other Eastern states. The following spring and summer, gas companies received many claims for gas-injured trees, shrubs, and lawns. Some of these claims were legitimate—many were not. The utilities were in a difficult position as to which claims to pay, and which not to pay. My organization gave every assistance to help these companies place a fair value on the damage, as well as to prepare briefs for court cases where our men were called as expert witnesses. Our reports helped to bring many a case to a friendly and satisfactory end.

One case, however, was more serious. A city brought suit for damage done to its trees, claiming that they had been killed by gas. A thorough inspection showed some gas injury, and we treated the trees, thereby saving over 90% of them. To-day these same trees are in better condition than other ones in the vicinity. We were able to make a complete settlement with the city, and the cost of settlement plus our fee totalled less than 10% of the amount of the claim. The original amount, by the way, was based on values set some years earlier by the courts of the same district. A survey of the rest of the distribution system in this city revealed other situations which, while not serious enough to be noticed by the layman, were readily recognized by our experts, and conditions were remedied before claims arose by simply repairing the gas leaks.

A thorough study of the results followed. Several hundred miles of mains were available for a trial, and the results were even more favourable than we had hoped.

This service started out as a tool to facilitate the handling of claims. This continues to be very important, and to-day we report on any foliage injury that might be mistaken for gas injury, but definitely is not, as well as reporting on the cases that are gas.

The following is a summary of what has been done to date:

50,000 miles of mains have been surveyed (many of these on an annual basis—therefore repeat mileage).
Several million trees have been observed.
Many thousand trees, shrubs, and lawns saved.
60,000 cases have been written up.
Thousands of claims prevented—others settled at no cost.
50,000 new gas leaks have been located.
The average cost has been $1.50 per mile.
The average cost has been $1.50 per leak.

"Why don't gas companies do this job themselves?" I don't know the rules pertaining to answering a question with a question, so will say, "Why do gas companies hire a doctor, a dentist, or an auditor?" Because certain services can be rendered more economically by an outside party. Either there is not enough work to make it a full time job, or, as in the case of an auditor, the report is more valuable when made by a third party. This covers only part of the answer, however. The most difficult task, the training of men to do this work, is the rest of the answer. Less than 1% of the good tree men make good diagnosticians, or survey men. The secret of success is finding a man who was *born with the ability to diagnose*, who has years of experience, coupled with the very thorough training given in our own school. In addition, he must have a liberal sprinkling of common sense, and a personality that will allow him to make this mixture function. With the above characteristics, it is still necessary to have the prospective survey man go on actual field surveys as a student with several men who have already proved themselves. After the student has been given an O.K. by these instructors, he will then be given an opportunity of his own. Locating gas leaks is not magic, but it is a fact that while there are no "rabbits to be brought out of the hat," this survey work is a highly specialized field.

The special training and experience which has been emphasized makes it possible for our men to diagnose a case much more speedily, and in much earlier stages than the layman can. Vegetation has its "normal green," varying at different times of the year, and other characteristics that only the "man who knows" can check on. To prove this point, several distribution systems were covered, as follows:

System A: First covered by a gas man, and followed by a tree man.

System B: Covered first by a tree man, secondly by a gas man.

System C: Covered by a gas man and a tree man together.

So far, the tree man has won the decision in all cases on both counts of finding more leaks, at less cost.

How are these surveys made?

1. The vegetation expert rides over the streets where mains are located at a speed not to exceed six or eight miles per hour or, depending upon foliage conditions, he may walk over certain parts of the areas.

2. The vegetation expert spots a case that falls into the gas injury group. He makes out a report on the *condition*, *location*, *species*, &c., for valuation, and a complete report of diseases infecting the plant. If he decides that there is a gas injury, he makes a final check of the soil and checks for gas in the root area, depending upon how noticeable the symptoms are. This check with a meter is made so that the gas company will save a trip out to make a similar test. Otherwise, there might be certain border-line cases where we were not positive of the cause of the injury. Reports are made when gas is the cause of the injury as well as when gas is not a major factor.

3. He makes a report of the gas main location by a sketch on the back of the report and grades the leak (small, medium, large) if a leak exists. This goes to the gas company daily. The complete report is sent out to the main office for checking, indexing, &c., and a copy is returned to the gas company later. The expert may recommend treatment depending upon local conditions, and the experience of the local gas company with like situations.

4. A double-check of conditions near greenhouses has paid real dividends.

As regards complete steps in the process of injury to vegetation by gas, many things are yet to be learned on this subject, but, after years of field and laboratory investigation, the following conclusions have been reached.

Gas injury to vegetation results from gas being present in the root areas, not in the air above the ground. In the case of manufactured gas: (1) The existence of cyanogen or hydrocyanic acid, even in small amounts, has a toxic effect on cell structure. The poison is accumulative, similar to that of lead in the human body. (2) Displacement of oxygen in the soil (usually by carbon monoxide). Oxygen is vital to plant life, being necessary in the process of changing the minerals and vegetable matter into a usable form of plant food for the roots to take up. Natural gas does not have the same toxic effect on cells, although ethylene, propylene, acetylene, butylene, &c., are known to be harmful. It does, however, displace the oxygen causing an unbalance to the normal bacterial and other soil processes, thereby smothering the vegetation or starving it. Also, natural gas is usually dry, and will desiccate the root area and kill the hair or feeder roots (dry manufactured gas does the same thing).

In addition to general indications, there are a number of definite symptoms which are known to exist. For instance, a certain fungus (nicknamed by our men "gasbug") apparently attacks only gas-injured trees; the formation of a jelly-like growth in the cambium layer on certain species of trees indicates gas injury; a distorted structure in the growth of grass blades appears only when grass has been gas-injured. In certain cases gas will cause a turning down of the leaf stems, called epinasty. This is caused by too much stimulation, due to ethylene, and once caused a misstatement that gas was good for plants. These symptoms, with many others to which we are now giving further study, must be given a thorough check and cross-check before putting on the permanent record. This is being done, and the information will be passed along as soon as it is available. Our studies show that certain trees, shrubs, and grasses seem to be more resistant to some types of gas. However, the

* Paper given before the Technical Section, Pacific Coast Gas Assn.

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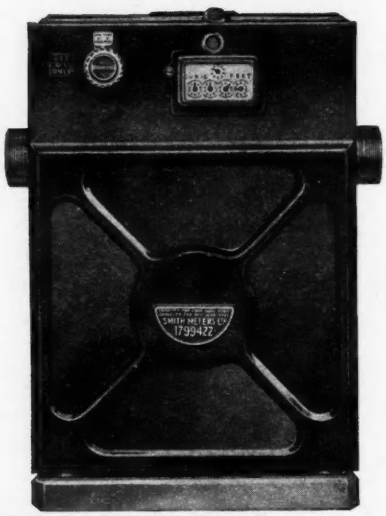

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indications in certain species of trees vary considerably. We find that a small gas leak over a long period of time may cause the leaves of a tree to be greatly reduced in size, result in partial or complete discoloration and abscission. The discoloration may be general or localized to individual leaders (main branches). Quite often there are a number of scattered dead branches in the crown of the trees. On the other hand, a larger amount of gas over a shorter period may result in the drying, killing, and wilting of the leaves, with or without discoloration or abscission, generally followed by death of individual limbs or the top of the tree, the latter giving a "stag-head" appearance. This is especially noticeable in elms and maples. It is quite possible that distinct proliferation will be noted, especially in poplar, willow, and some other fast-growing species. The exact causes as well as the various stages of injury are still being studied. This lack of certain facts does not affect our results.

The steps that we have followed in successfully treating trees are:

1. Eliminating source of gas leakage (repair leak).
2. Thorough soil aeration (the suction method is believed to be more practical than the older system of blowing the gas out).
3. Making a soil test to determine the type and strength of the mineral constituents necessary to increase the vigour of the tree; fertilizing the tree with a properly balanced plant food.
4. Systematic sub-soil irrigation by means of installed dry wells.
5. Pruning of decayed branches one season following the injury.

The following is a direct quotation from a Paper presented by a gas company official, giving his reasons for using this service:

"1. Very low cost per mile (only one method of survey can locate more leaks, and this is to bar every 12 to 18 ft. and test with a combustible meter, with costs running very high).

"2. Speed of completion.

"3. It is not conspicuous, and will improve public relations because of the simplicity and speed of the method.

"4. This method offers a way of relieving existing small organizations from the responsibility of laborious surveys, and permits time to complete the general routine daily work more easily and effectively.

"5. It provides a very economical method of leakage correction, and pays a very nice return on the money invested in the survey.

"6. It gives a systematic and accepted standard method of leakage correction which should combat accusations of negligence and damage suits.

"7. It applies to manufactured gas, natural gas, butane-air gas, &c."

RESULTS OF THE VEGETATION METHOD OF LOCATING GAS LEAKS. THE BALANCE SHEET OF AN AVERAGE SMALL GAS SYSTEM.

ASSETS. *Estimated Results.		LIABILITIES. *Estimated Costs.	
Number of miles of main	100	‡Survey cost	$180.00
Number of gas leaks located	106	Repair costs ...	$800.00 to $1600.00
†Number of cu.ft. of gas saved:	4,000,000 to 16,000,000	Total	$980.00 to $1780.00
Dollars saved (est. at 30c. M).	$1200.00 to $4800.00	Estimated savings, without additional value of handling claims, for first year	$220.00 to $3020.00

* Based on Surveys made by Heath Tree Service, Inc., for several hundred gas companies in thirty states and part of Canada.

† Based on results given by gas companies that made metered tests of actual leaks under normal field conditions on low pressure systems. (Average is somewhere between these limits.)

‡ This cost gets lower as the mileage increases. The average cost last year was $1.44 per mile.

THE WAR AND PATENTS RELATING TO GAS MANUFACTURE

By S. T. MADELEY

THE Gas Industry, like every other, has felt the effect of the war. It will be interesting to compare the situation of patentees now with that existing during the 1914–1918 war, and to consider their probable future position.

The Author has estimated that the numbers of patents granted in the last thirty years relating to gas manufacture and distribution are as given in the accompanying Tables I and II.

TABLE I.—PATENTS GRANTED RELATING TO GAS PRODUCTION, SEPARATION, AND TREATMENT, &C.

Year.	Patents.	Year.	Patents.	Year.	Patents.
1910	209	1921	185	1932	260
1911	219	1922	186	1933	193
1912	192	1923	190	1934	229
1913	200	1924	193	1935	188
1914	179	1925	204	1936	180
1915	132	1926	208	1937	165
1916	91	1927	219	1938	171
1917	102	1928	229	1939	141
1918	114	1929	248	1940	91
1919	126	1930	281		
1920	145	1931	283		

TABLE II.—PATENTS GRANTED RELATING TO GAS DISTRIBUTING SYSTEMS, GAS HOLDERS, GAS MAINS AND PIPES, GAS METERS, &C.

Year.	Patents.	Year.	Patents.	Year.	Patents.
1910	33	1921	23	1932	35
1911	34	1922	24	1933	30
1912	30	1923	24	1934	31
1913	31	1924	25	1935	31
1914	27	1925	26	1936	34
1915	19	1926	26	1937	35
1916	13	1927	27	1938	38
1917	13	1928	29	1939	35
1918	16	1929	31	1940	24
1919	17	1930	35		
1920	19	1931	37		

The fall due to the war of 1914/1918 and the rapid recovery is obvious. This is followed by a steady improvement up to 1930, and then a set-back due to economic conditions following. There is a good rise again to 1934, when, of course, the beginning of the present emergency shows its effect.

The 1914/1918 war saw us economically practically unprepared from the patent point of view. Dislocation of trade was increased by the provisions as to Trading with the Enemy, by the Excess Profits Tax, by War Service and National Service by patentees, and by Government interference with orders. Over all, stood the ominous fact that a patent had normally only fourteen years of life, out of which 4, 5, or 6 might well be lost owing to the war.

In a patent calculated to return, say, £80,000 in the ordinary way of things, this might mean over £30,000 loss—not an encouraging vista for shareholders, and a terrible handicap for the development of new inventions. Standardization by competitors also faced the owners of many expiring patents.

There was the question of possible actions for infringement of enemy patents through war work.

To take care of all this, patents had their term extended from 14 to 16 years. Foreign countries acted on similar lines. Belligerents granted reciprocal moratoria for payment of fees, late filing patent applications under the Convention, and so on. The Peace Treaty dealt with these matters under Sections 307 and 308. Section 309 cleared up the infringement business. A Commission for Awards to Inventors was appointed, with powers to award up to £50,000 in respect of a patented invention. The Commission could recommend the Treasury to award more. As regards an unpatented invention, it could only recommend the Treasury to make an award.

Under the Patents, &c., Act, 1907, by its eighteenth section power was given to the Court to extend the term of patents in suitable cases. The post-war Act was amended by the introduction of Section 18 (6), whereby the Court could extend the term of a patent on the ground of loss or damage solely due to hostilities.

When the present war started, the Patents, &c. (Emergency), Act, 1939, was passed, Section 2 of which gives the Comptroller power to grant licences on reasonable terms, under enemy patents. The licences contain provisions to protect the licensees against infringement action. Under Section 6 he can extend the time for filing applications under the Convention.

The General Licence issued by the Board of Trade permits a certain amount of business in patent matters between this country and abroad, but, at best, such intercourse is very restricted. Now that most of Europe is occupied by the Germans, the Board of Trade notice concerning trading with the enemy is further restrictive. Most probably a large number of patent applications are awaiting filing here under the International Convention in spite of Section 6.

Under the present conditions of destruction by air raids, conscription, and canalization of national effort, Government control of supply, and E.P.D. at 80% (net), progressive industry, as represented by invention, is being crushed out of existence.

It would appear that the time is now arriving for a complete overhaul of our patent system.

If the Comptroller of Patents had power to extend the life of a patent to the end of the war, on application to him, it would leave the patentee free from worry until Section 18 (6) could be called into play. An automatic extension of term from 16 to 18 years would be very acceptable. Renewal fees might be foregone or reduced, if the Treasury would permit. £500,000 or so per annum is very nice, but almost indistinguishable in our astronomic expenditure of the day. The reduction would be helpful to the impecunious inventor. Let us hope for a post-war moratorium and a new Commission for Awards to Inventors.

The patent question in relation to the war is being very carefully considered in many of the above aspects by those entitled to form an opinion. Meanwhile manufacturers can assist themselves. They can take licences under enemy patents through Section 2 of the Emergency Act, try them out, improve on them, and patent their own improvements.

They should also carefully consider before abandoning their foreign patents or pending applications or neglecting to file new ones. One cannot tell what action foreign countries will take in this matter after the war. There is always the bogy of third party rights. And we shall want all the export trade we can get.

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Gas Products Prices

The London Market

May 19.

To-day's prices of tar products in the London market remain approximately as under: Pitch is nominal; creosote 4¾d. to 5d.; refined tar 3¾d. to 4d.; pure toluene under the Ministry of Supply Toluene No. 2 Order is 2s. 5d.; pure benzole is 1s. 10d.; 95/160 solvent naphtha, 2s. 5d. to 2s. 8d.; and 90/160 pyridine, 13s. 6d.; all per gallon naked; refined crystal naphthalene is £23 per ton in bags; all prices are *ex* Makers' Works.

The Provinces

May 19.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 10d. to 11d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha North, 1s. 6d. to 1s. 7½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; Scotland, 4¼d. to 4¾d.; low gravity, 4½d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £12 to £15. Salts, 70s. to 80s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 5¼d. to 5½d.; filtered heavy oil (min. gr. 1,080), 5¾d. to 6d.; heavy anthracene oil gr. less than 1,080, 6d. to 6¼d.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note in our issue of Sept. 4, 1940, p. 404.

South-Eastern Gas Corporation, Ltd.

The Directors of South-Eastern Gas Corporation, Ltd., recommend the payment of a final dividend on the ordinary shares of 2½% actual, less tax, making with the interim dividend already paid a dividend of 4%, less tax, for the year ended March 31, 1941 (last year 5½%, less tax). The General Meeting will be held on June 18, 1941.

Tar Products in Scotland

GLASGOW, May 17.

No material alteration in prices can be recorded during the week. The bulk of production is well sold forward on contract and deliveries are proceeding rapidly.

Refined tar is offered quite freely at 4¼d. to 4¾d. per gallon in the home market and 3¼d. to 3½d. per gallon for export, both f.o.r. naked.

Creosote oil: There is a steady demand and light qualities are not too plentiful. The following prices are about average: Specification oil, 5d. to 5¼d. per gallon; low gravity, 6d. to 6¼d. per gallon; neutral oil, 5¾d. to 6d. per gallon; all *ex* Works in bulk.

Cresylic acid: This product is still commanding considerable attention with prices firmer as follows: Pale, 99/100%, 2s. 11d. to 3s. 1d. per gallon; Pale, 97/99%, 2s. 7d. to 2s. 9d. per gallon; Dark, 97/99%, 2s. 4d. to 2s. 6d. per gallon; all *ex* Works in buyers' packages.

Crude naphtha shows no alteration at 6½d. to 7½d. per gallon *ex* Works in bulk, according to quality.

Solvent naphtha: 90/160 grade is 1s. 8½d. to 1s. 9d. per gallon, and 90/190 Heavy Naphtha is 1s. 4½d. to 1s. 5½d. per gallon.

Pyridines are still without interest at round 14s. per gallon for 90/160 grade and 16s. per gallon for 90/140 grade.

C. & W. Walker, Ltd.

Reviewing the results of the year's working at the Annual Meeting of C. & W. Walker, Ltd., on April 23, Mr. R. J. Milbourne said everyone recognized that the Gas Industry was of vital importance to the country, and the Company could face the future with confidence and be prepared to deal with altered conditions when the war had been brought to a successful conclusion. The net profit for the year ended Dec. 31, 1940, was down by £3,400 at £14,287, to which must be added the balance brought forward of £12,309, making a total of £26,597 available for distribution in accordance with the recommendations of the Board. No effort would be relaxed in the present year to keep the Company in its present pre-eminent position in the Gas Industry. The Chairman concluded with an expression of gratitude to the Joint Managing Director, the General Manager, the technical and clerical staff, and the whole of the foremen and workmen for their loyal and unremitting devotion to the Company.

Gas Stocks and Shares

Business on the Stock Exchange again remained at a low level for the most part of last week and prices tended to react. Gilt-edged securities were also quieter and several among British Funds closed fractionally lower —2½% Consols were unchanged, however, at 78½. The increased wages award had surprisingly little effect on home rail stocks generally, although the junior issues were inclined to weaken. A number of gains were recorded during the week by leading industrials, but most of these were lost by Friday on the Vichy and Syrian news. Several recoveries took place among oils, and South African goldmining shares produced a few good features.

Apart from a fair demand for Gas Light units, there was very little doing in the Gas Market last week, other business being mostly confined to the fixed interest stocks of the leading undertakings. A few parcels of Commercial, Imperial Continental, and South Suburban ordinaries changed hands, and in all cases the quotations were again lowered.

OFFICIAL LIST

Commercial Ord.	25—30	−2	
Gas Light, 3 p.c. Deb.	67—72	+3	
Imperial Continental Cap.	40—45	−2	
Severn Valley Ord. (*x.d.*)	13/—15/—	May 12	
South Suburban Ord.	53—58	−4½	

SUPPLEMENTARY LIST

Gas Consolidation "A"	11/6—13/6	−/6

PROVINCIAL EXCHANGES

Sheffield, 4 p.c. Deb.	95—98	−½

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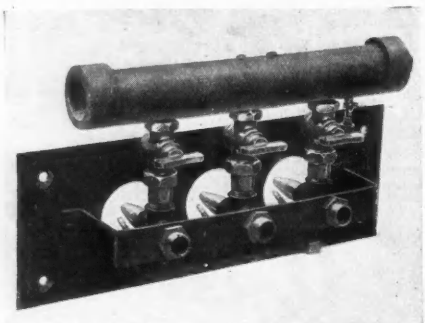

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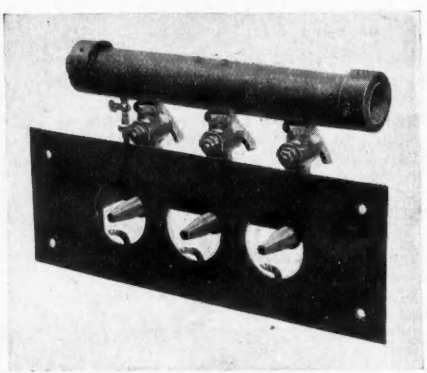

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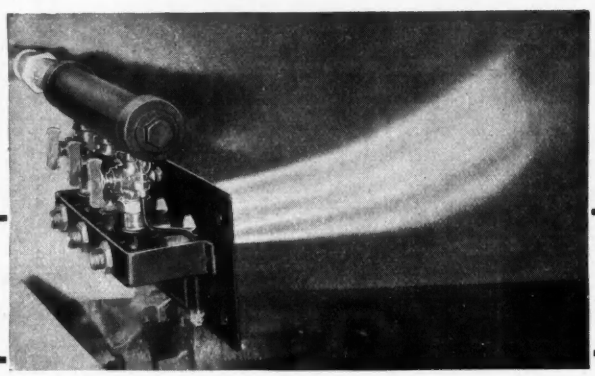

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